

The diagram illustrates a communication system between Terminal A (1) and Terminal B (2) over a channel (5) with impulse response $H = [h_{mm}]$.

Terminal A (1):

- SIGNAL SENDING PART (6):** Receives input signals $S_1(t), S_2(t), \dots, S_N(t)$.
- TRANSMISSION SIGNAL DETERMINING PART (8):** Processes the signals from the sending part.
- CONTROL INFORMATION RECEIVING PART (7):** Receives control information from Terminal B.

Channel (5):

- The channel is represented by $H = [h_{mm}]$.
- It consists of a series of multipliers (3) and adders (4).

Terminal B (2):

- INFORMATION SIGNAL RECEIVING PART (12):** Receives the signals $X_1(p), X_2(p), \dots, X_M(p)$ from the channel.
- PILOT SIGNAL DETECTING PART (9):** Detects pilot signals within the received signals.
- TRANSMISSION SIGNAL DETERMINING PART (10):** Processes the detected pilot signals.
- CONTROL INFORMATION TRANSMITTING PART (11):** Transmits control information back to Terminal A.

The signals $X_1(p), X_2(p), \dots, X_M(p)$ are the received signals at Terminal B, which are the sum of the transmitted signals from Terminal A and the pilot signals detected by the Pilot Signal Detecting Part (9).

FIG. 2

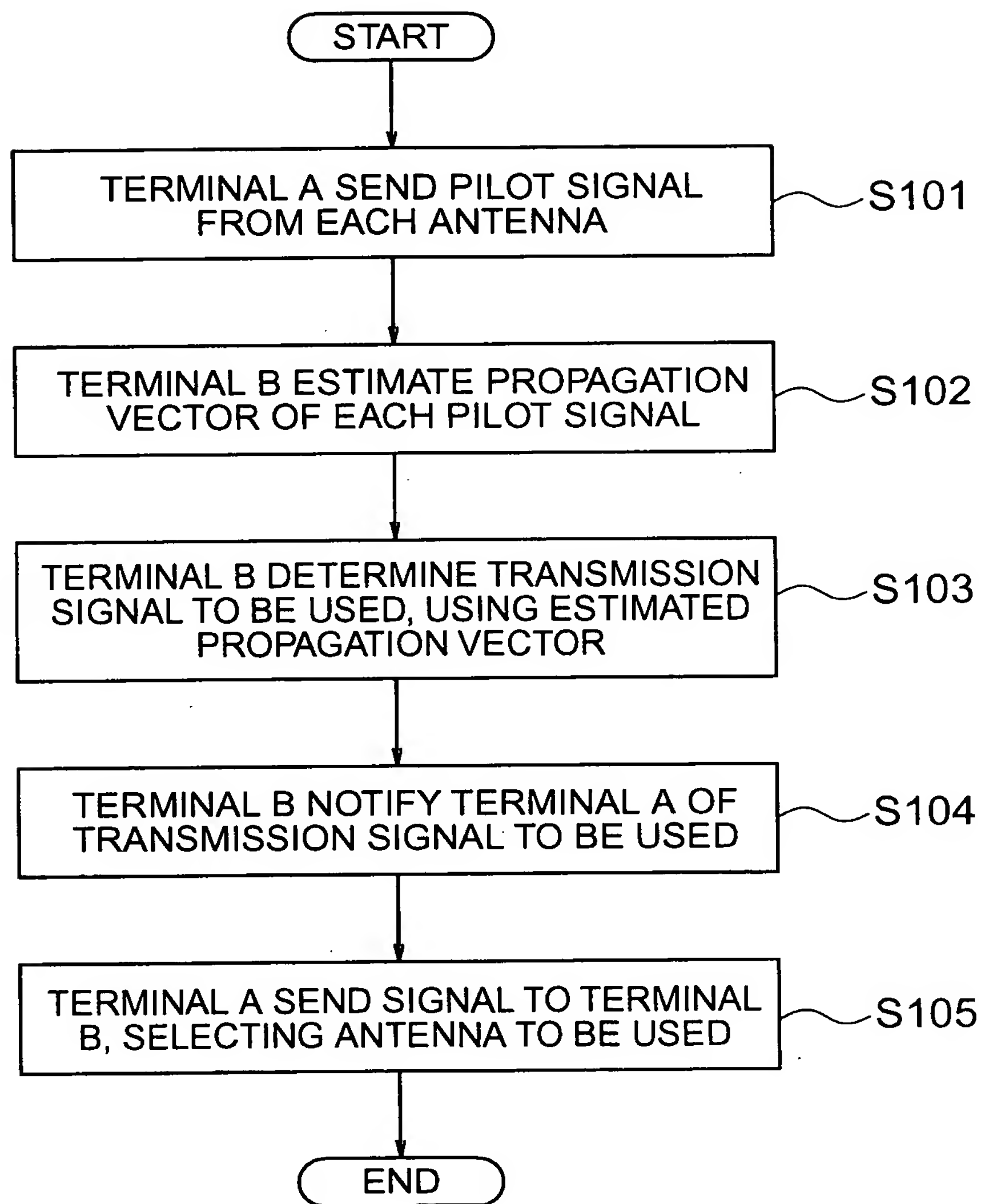


FIG. 3

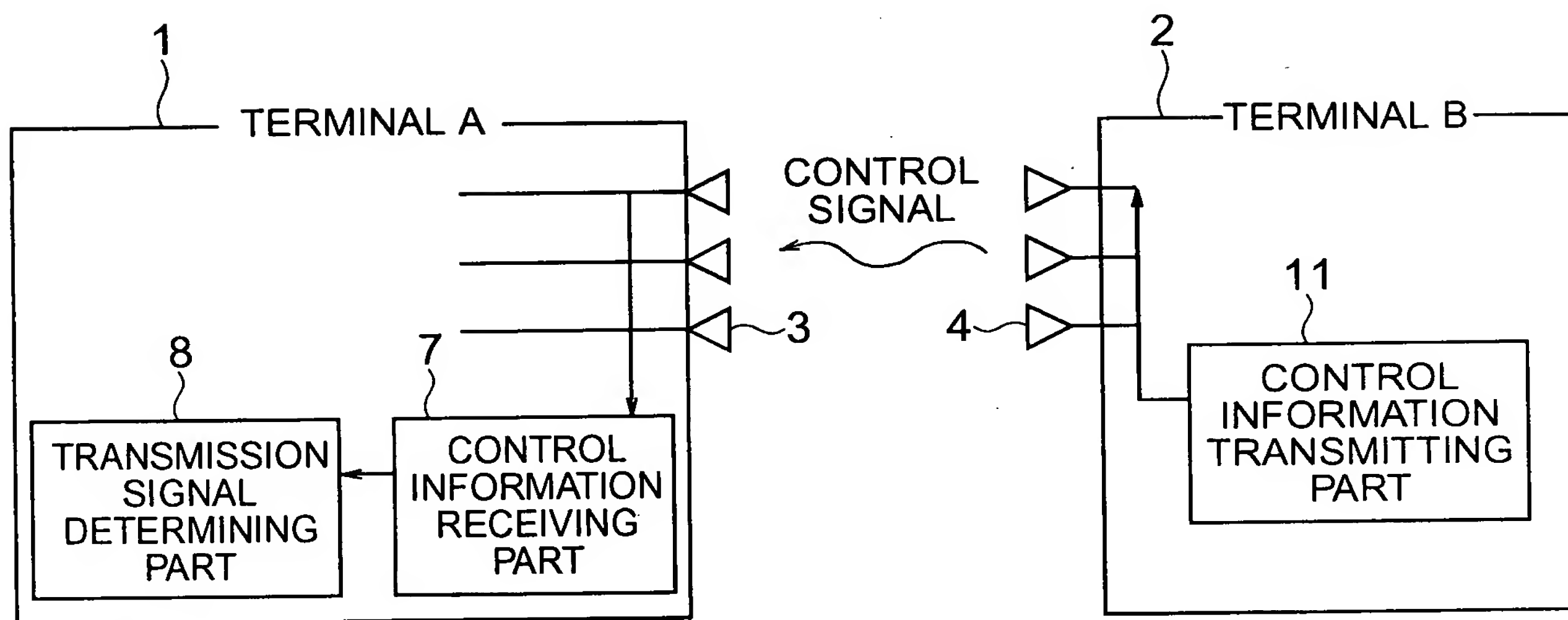


FIG. 4

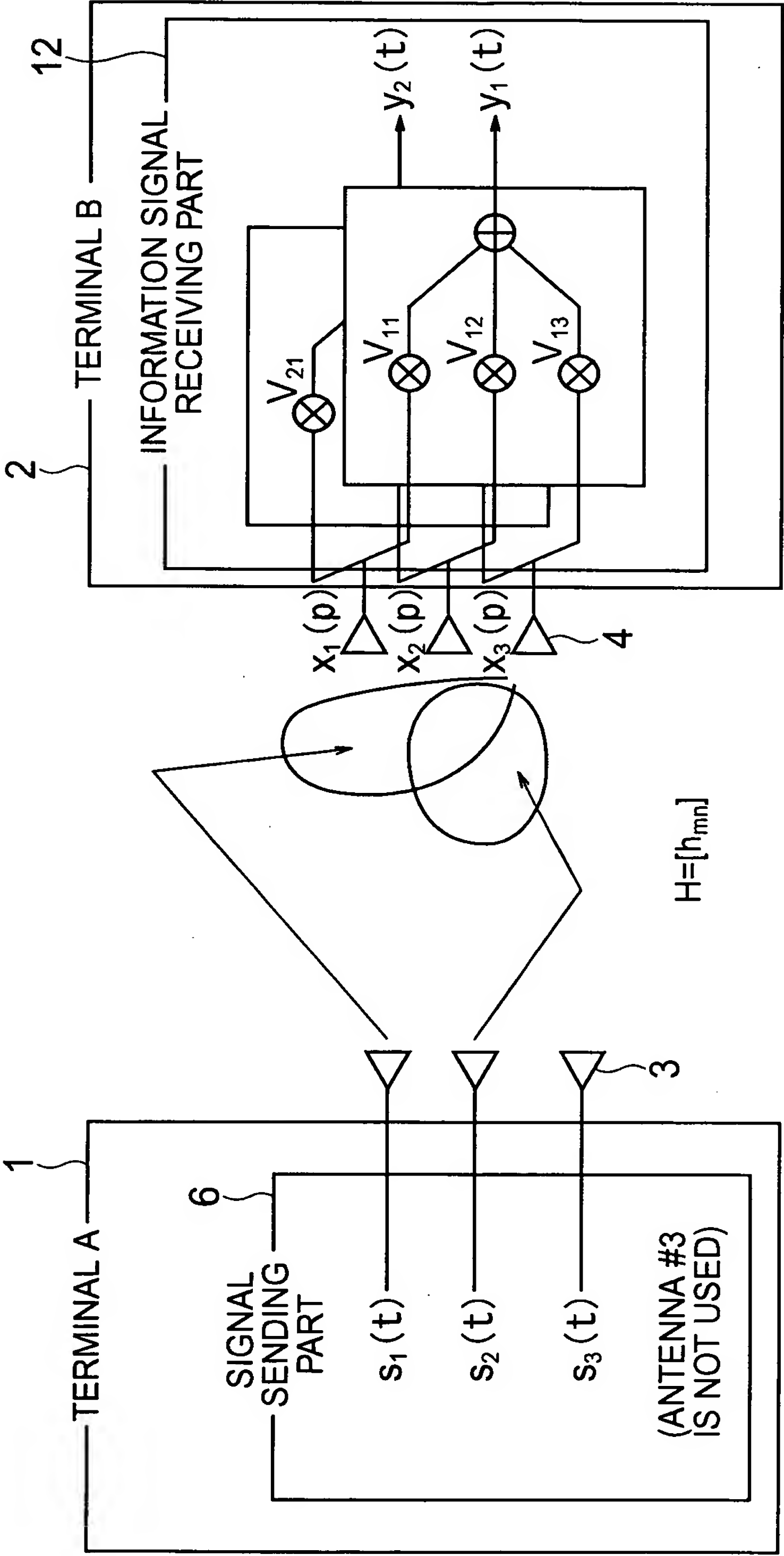
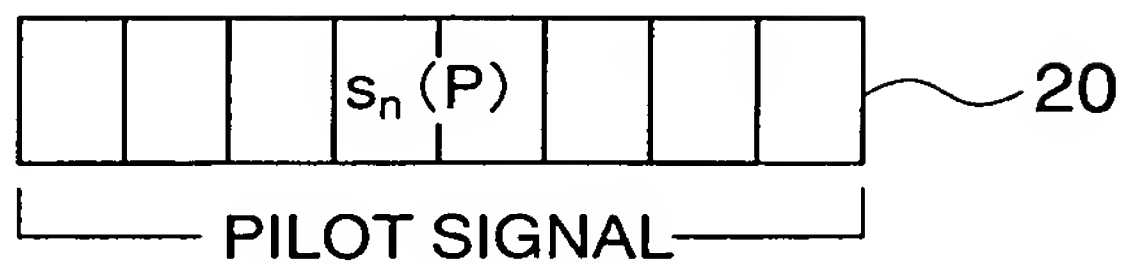


FIG. 5

(a) TERMINAL A \dashrightarrow TERMINAL B



(b) TERMINAL B \dashrightarrow TERMINAL A (CONTROL SIGNAL)

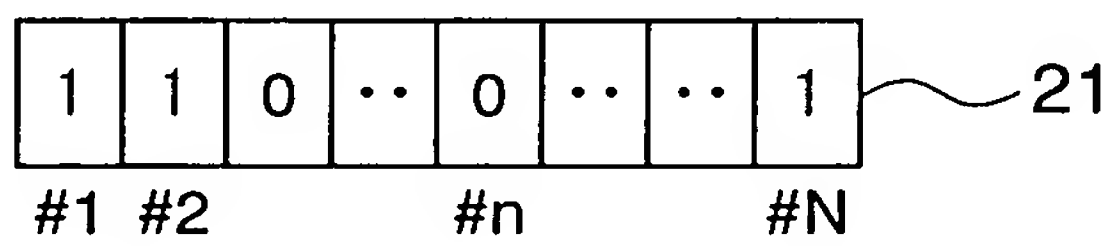


FIG. 6

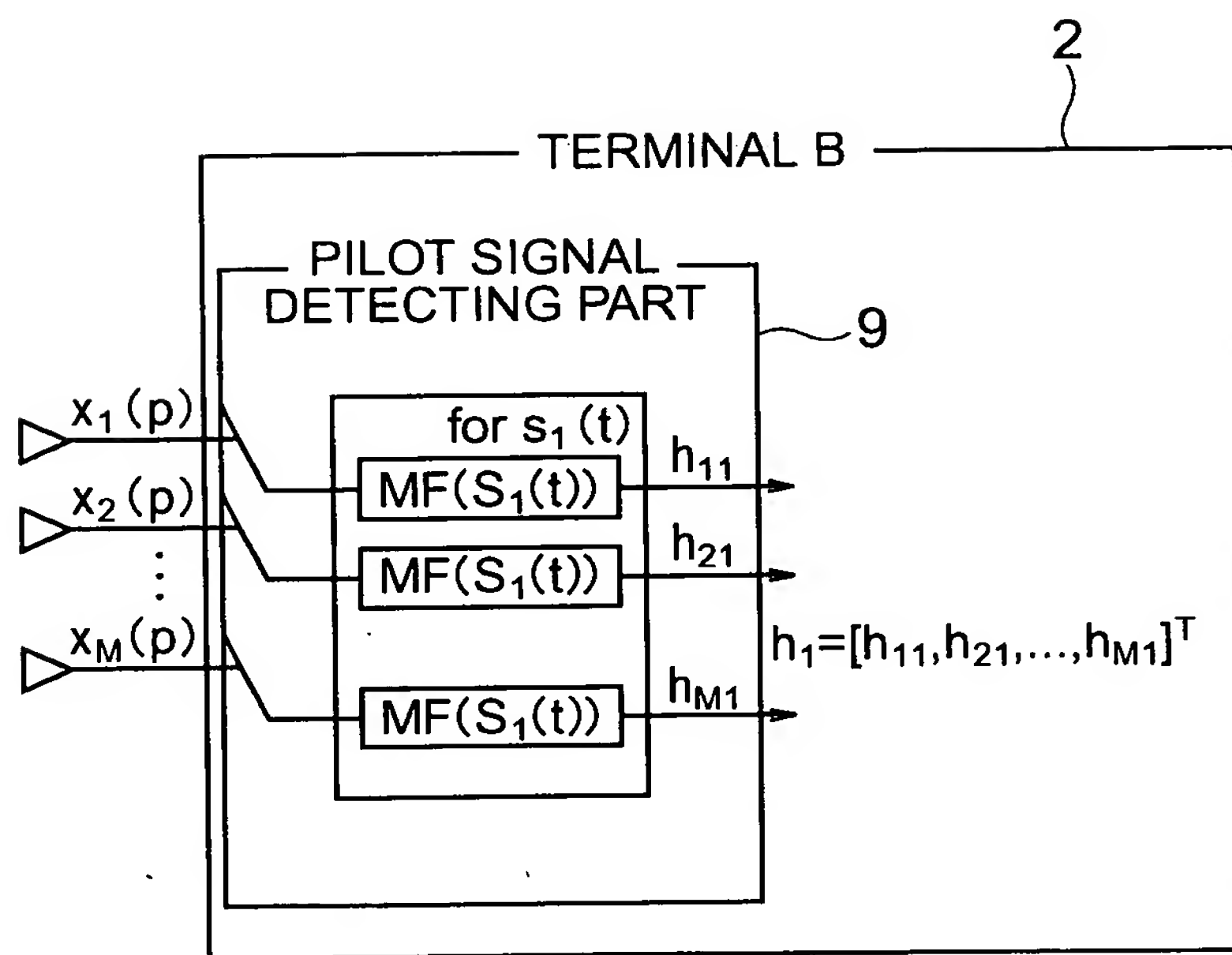


FIG. 7

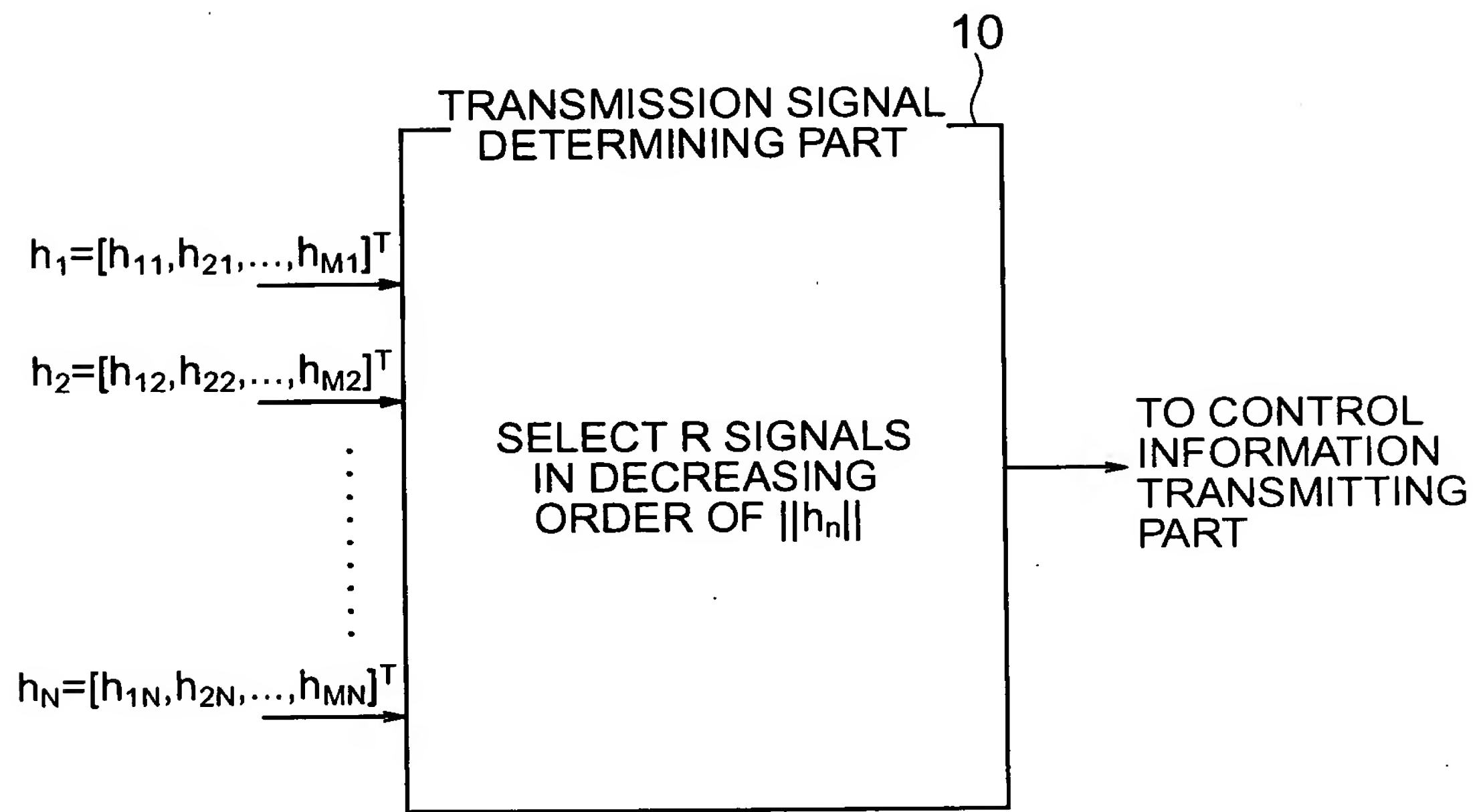


FIG. 8

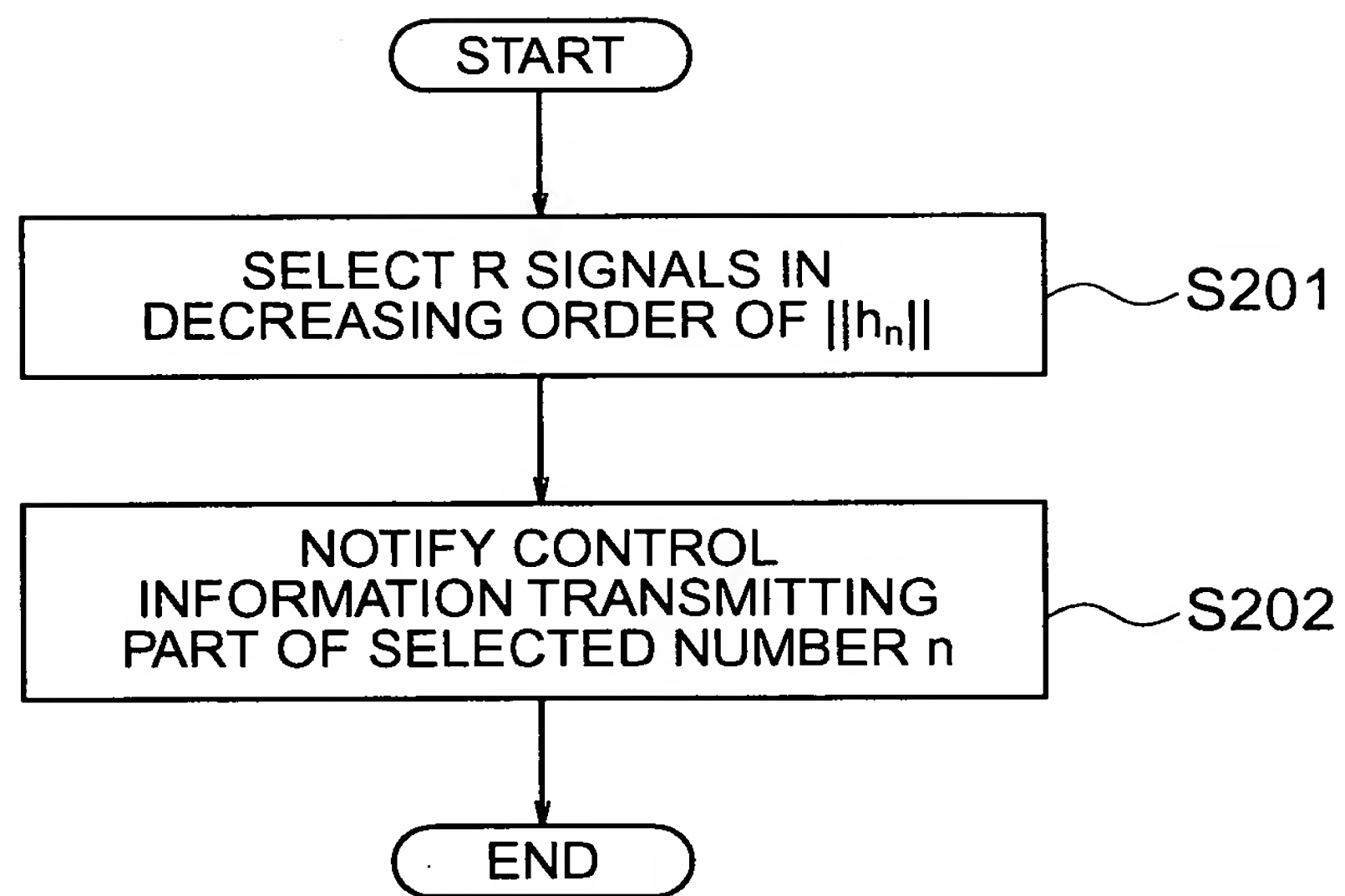


FIG. 9

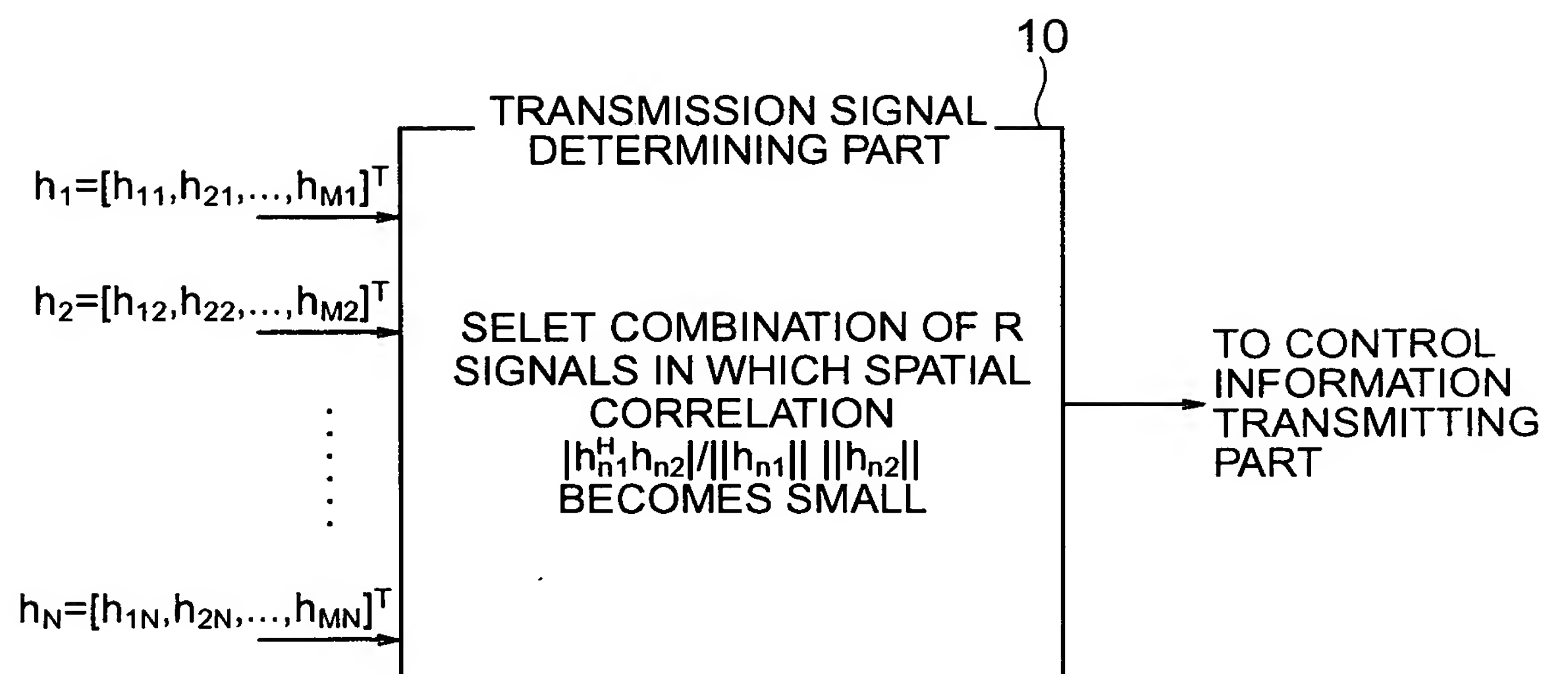


FIG. 10

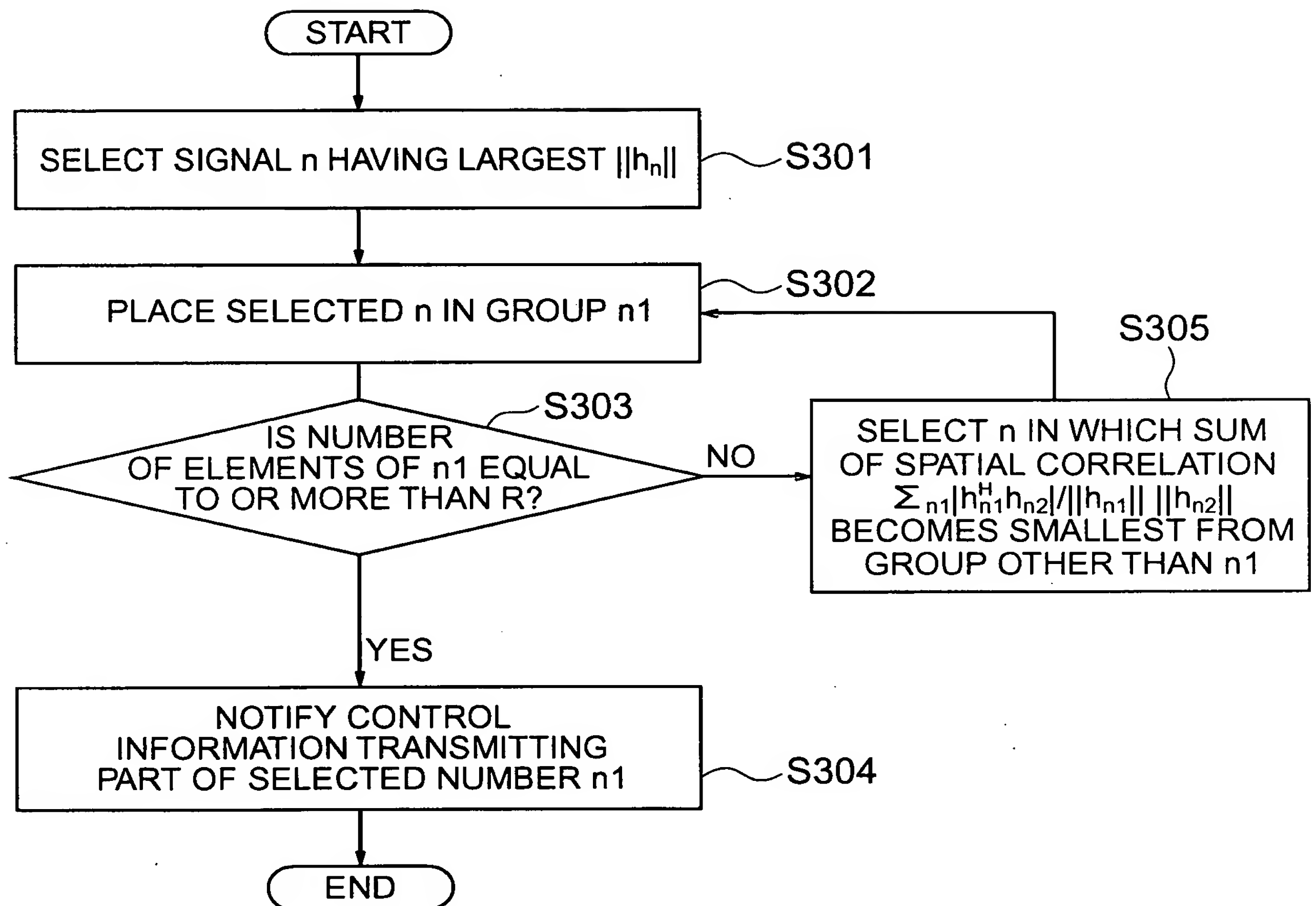


FIG. 11

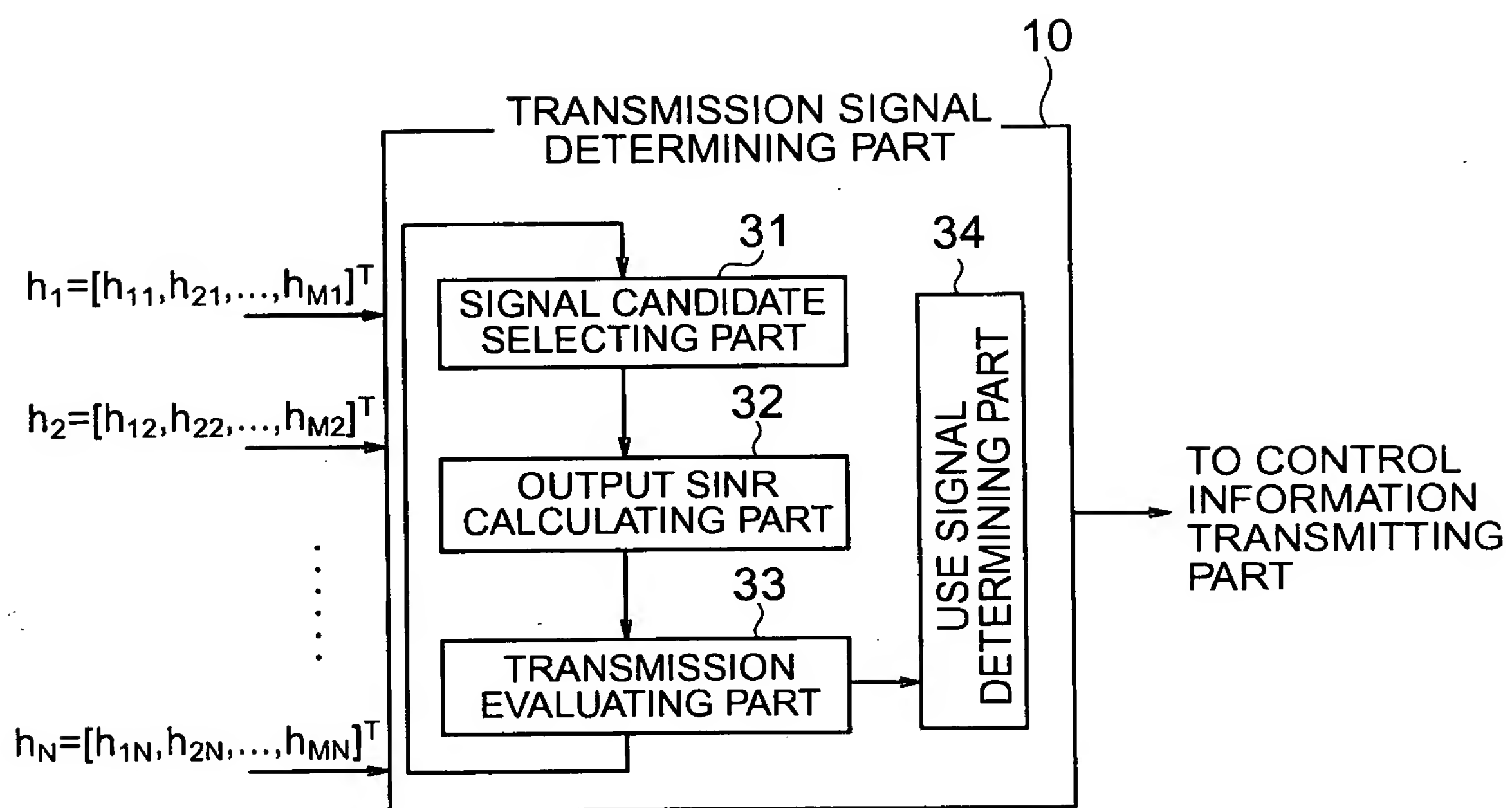


FIG. 12

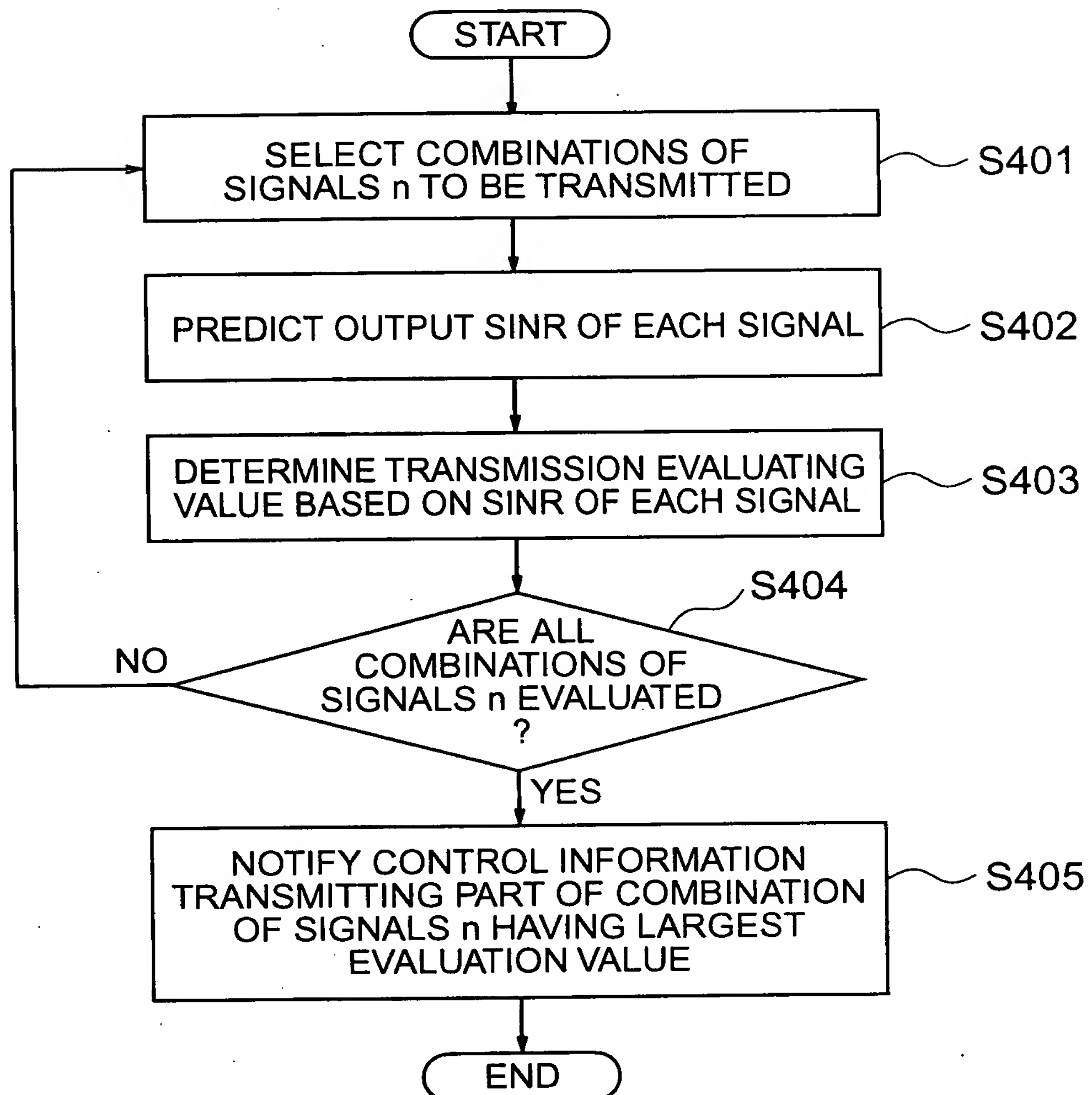


FIG. 13

◆ SINR PREDICTION

$$\overset{41}{\Gamma}_n = \frac{|h_n^H v_n(p)|^2}{v_n^H (\sum_{n0} h_{n0} h_{n0}^H + P_N) v_n - |h_n^H v_n(p)|^2}$$

v_n : RECEPTION WEIGHT $v_n = (\sum_{n0} h_{n0} h_{n0}^H)^{-1} h_{n0}$ IN CASE OF ZF STANDARD TYPE

$v_n = (\sum_{n0} h_{n0} h_{n0}^H + P_N I)^{-1} h_{n0}$ IN CASE OF MMSE STANDARD TYPE

\hat{P}_N : INTERFERENCE NOISE POWER ESTIMATED VALUE

FIG. 14

SINR[dB]	EVALUATION VALUE (ACCEPTANCE OR REJECTION OF USE)
-3	0
-2	0
⋮	⋮
3	0
4	1
⋮	⋮
28	1

FIG. 15

51 COMBINATION OF SIGNALS (#1,#2,#3) 1; USE, 0; NON-USE	52 OUTPUT SINR [dB] ($\Gamma_1, \Gamma_2, \Gamma_3$)	53 EVALUATION VALUE OF EACH SIGNAL (#1,#2,#3)	54 TOTAL OF EVALUATION VALUES
(1, 0, 0)	(7.0, 0.0, 0.0)	(1, 0, 0)	1
(0, 1, 0)	(0.0, 9.3, 0.0)	(0, 1, 0)	1
(0, 0, 1)	(0.0, 0.0, 6.2)	(0, 0, 1)	1
(1, 1, 0)	(6.0, 7.0, 0.0)	(1, 1, 0)	2
(0, 1, 1)	(0.0, 4.3, 2.9)	(0, 1, 0)	1
(1, 0, 1)	(2.8, 0.0, 1.1)	(0, 0, 0)	0
(1, 1, 1)	(-0.5, 3.4, 0.3)	(0, 0, 0)	0

※ IN CASE OF THREE TRANSMISSION ANTENNAS

SELECT LARGEST
EVALUATION VALUE

FIG. 16

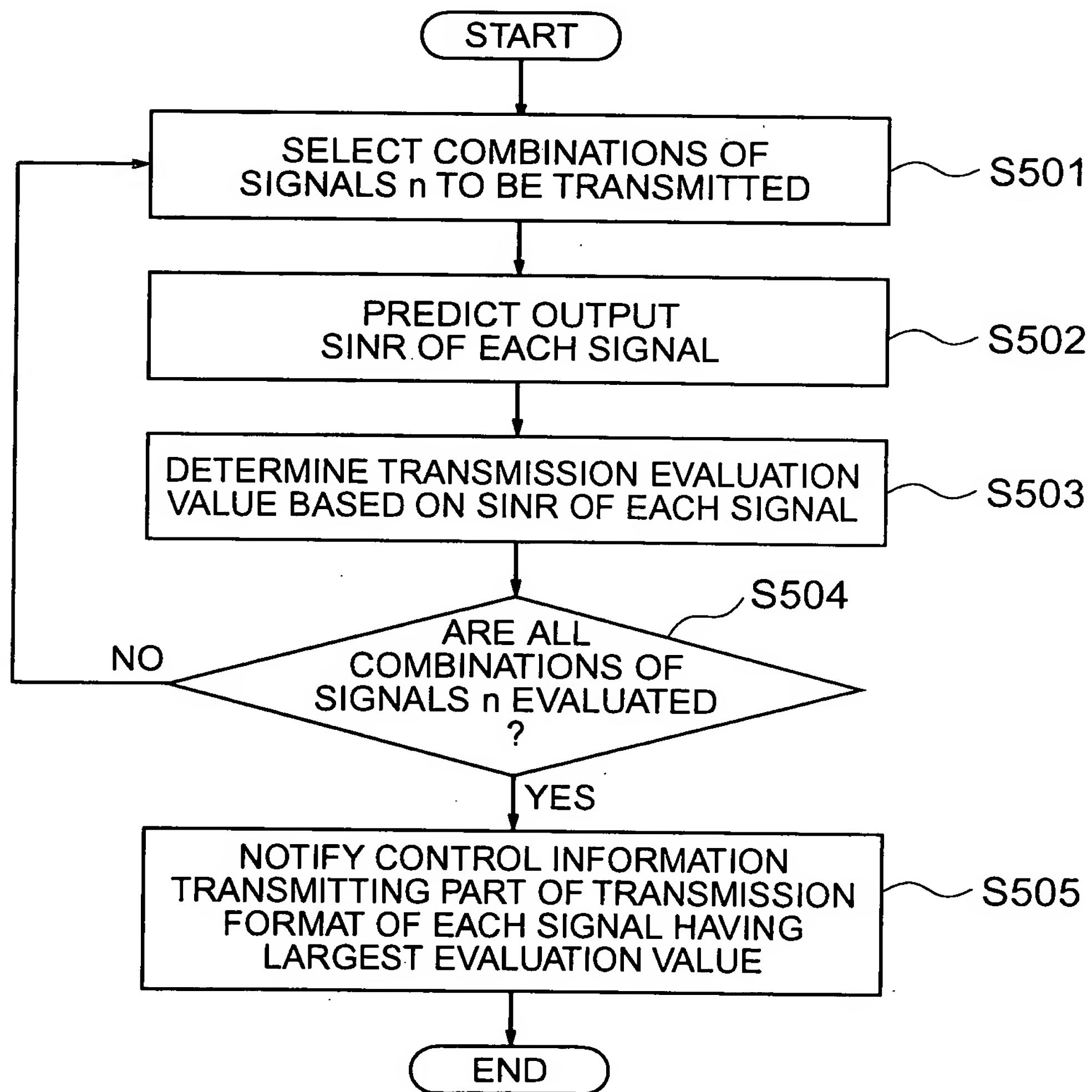


FIG. 17

61 TRANSMISSION SPECIFICATION NUMBER	62 SINR [dB]	63 MODULATION SCHEME	64 CODING RATIO	65 EVALUATION VALUE (TRANSMISSION SPEED)
0	~-3	No use	No use	0.000
1	-3~-2	QPSK	1/8	0.500
2	-2~-1	QPSK	1/7	0.571
3	-1~0	QPSK	1/6	0.666
4	0~1	QPSK	1/5	0.800
5	1~2	QPSK	1/4	1.000
6	2~3	QPSK	1/3	1.333
⋮	⋮	⋮	⋮	⋮
31	27~	16QAM	3/4	12.000

FIG. 18

71 COMBINATION OF SIGNALS (#1,#2,#3) 1; USE, 0; NON-USE	72 OUTPUT SINR [dB] ($\Gamma_1, \Gamma_2, \Gamma_3$)	73 EVALUATION VALUE OF EACH SIGNAL (TRANSMISSION SPEED)(#1,#2,#3)	74 TOTAL OF EVALUATION VALUES
(1,0,0)	(7.0,-,-)	(6.0,0.0,0.0)	6.0
(0,1,0)	(-,9.3,-)	(0.0,7.2,0.0)	7.2
(0,0,1)	(-,-,6.2)	(0.0,0.0,4.8)	4.8
(1,1,0)	(6.0,7.0,-)	(4.5,6.0,0.0)	10.5
(0,1,1)	(-,4.3,2.9)	(0.0,2.2,1.3)	3.8
(1,0,1)	(2.8,-,1.1)	(1.3,0.0,1.0)	2.3
(1,1,1)	(-0.5,3.4,0.3)	(0.6,1.5,1.8)	2.9

※ IN CASE OF THREE TRANSMISSION ANTENNAS

SELECT LARGEST
EVALUATION VALUE

FIG. 19

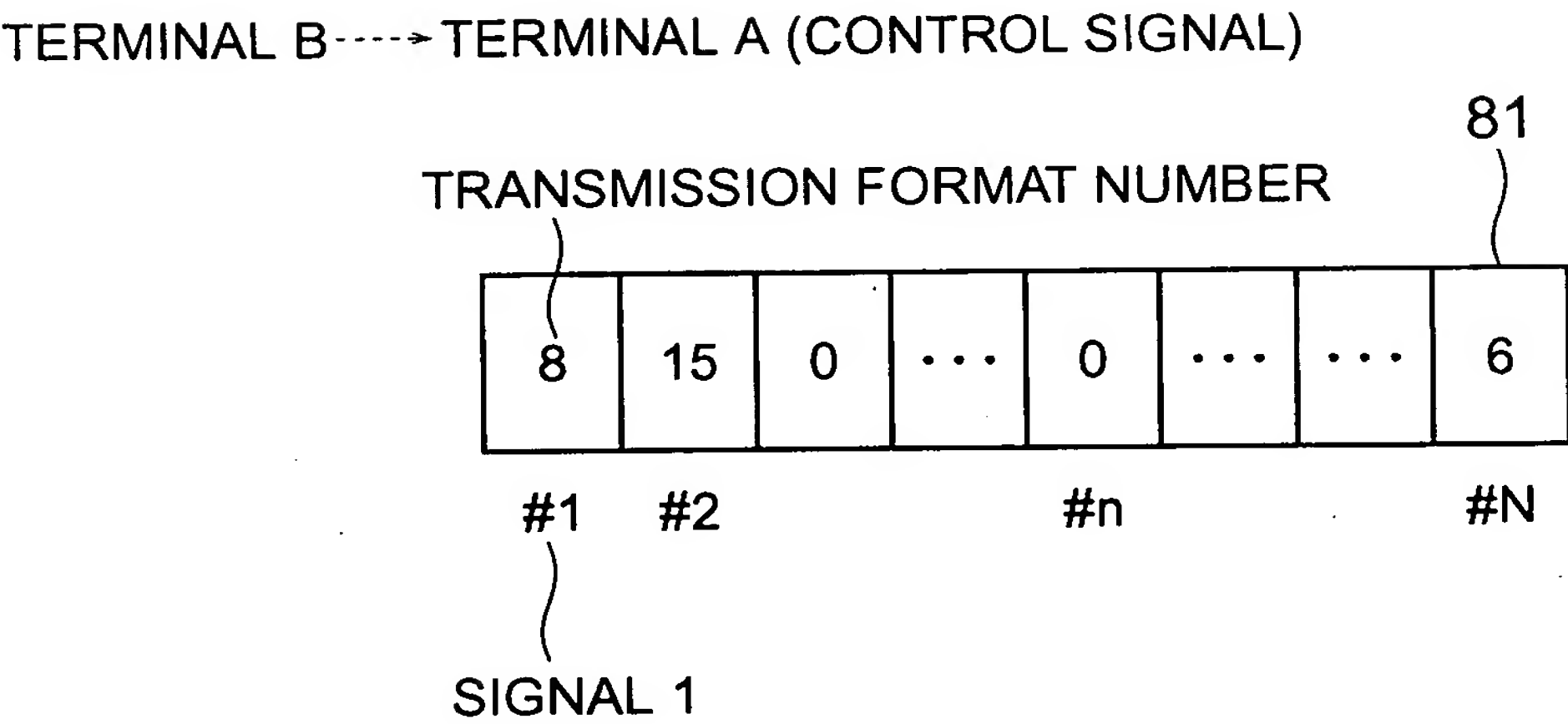


FIG. 20

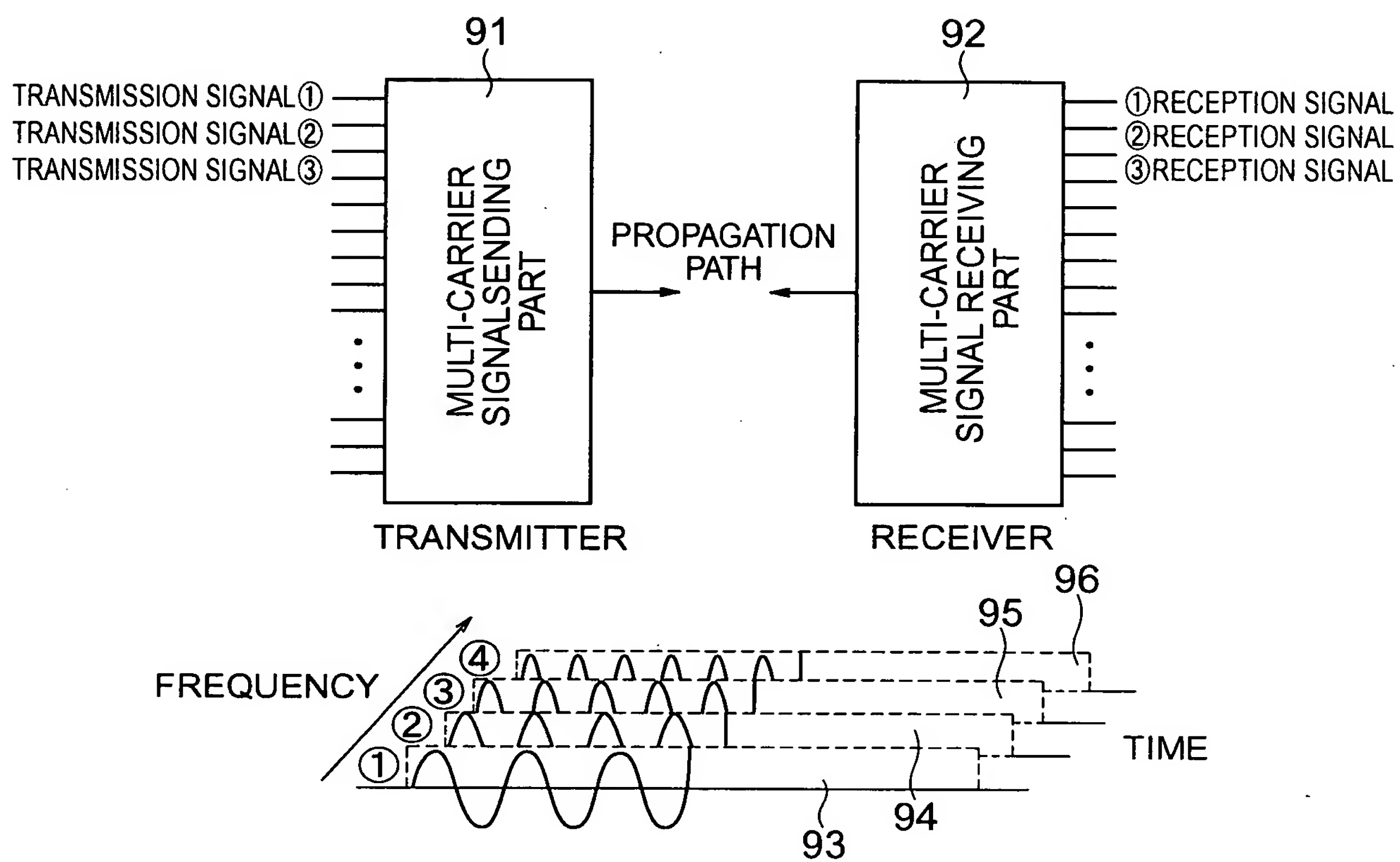


FIG. 21

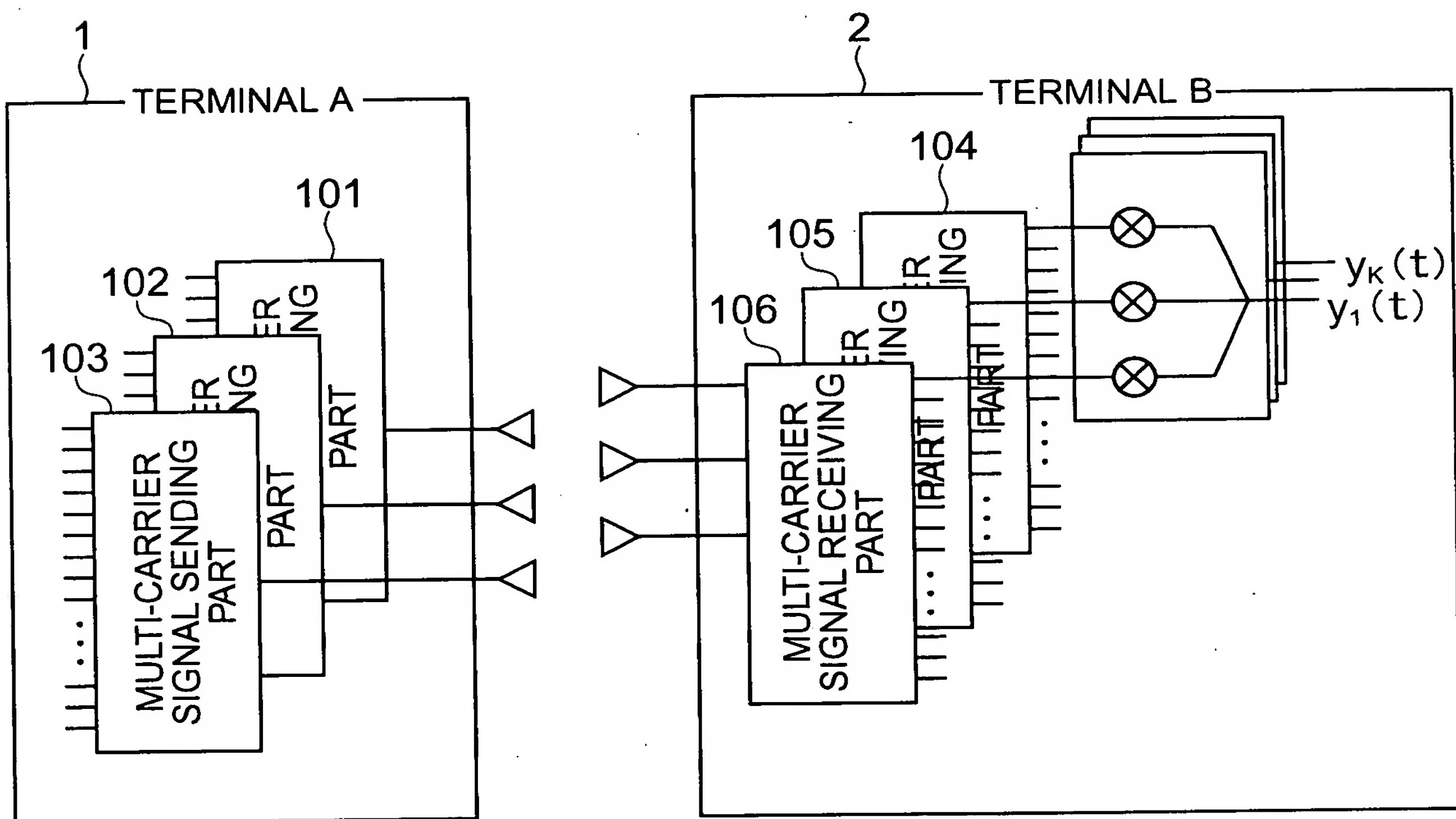


FIG. 22

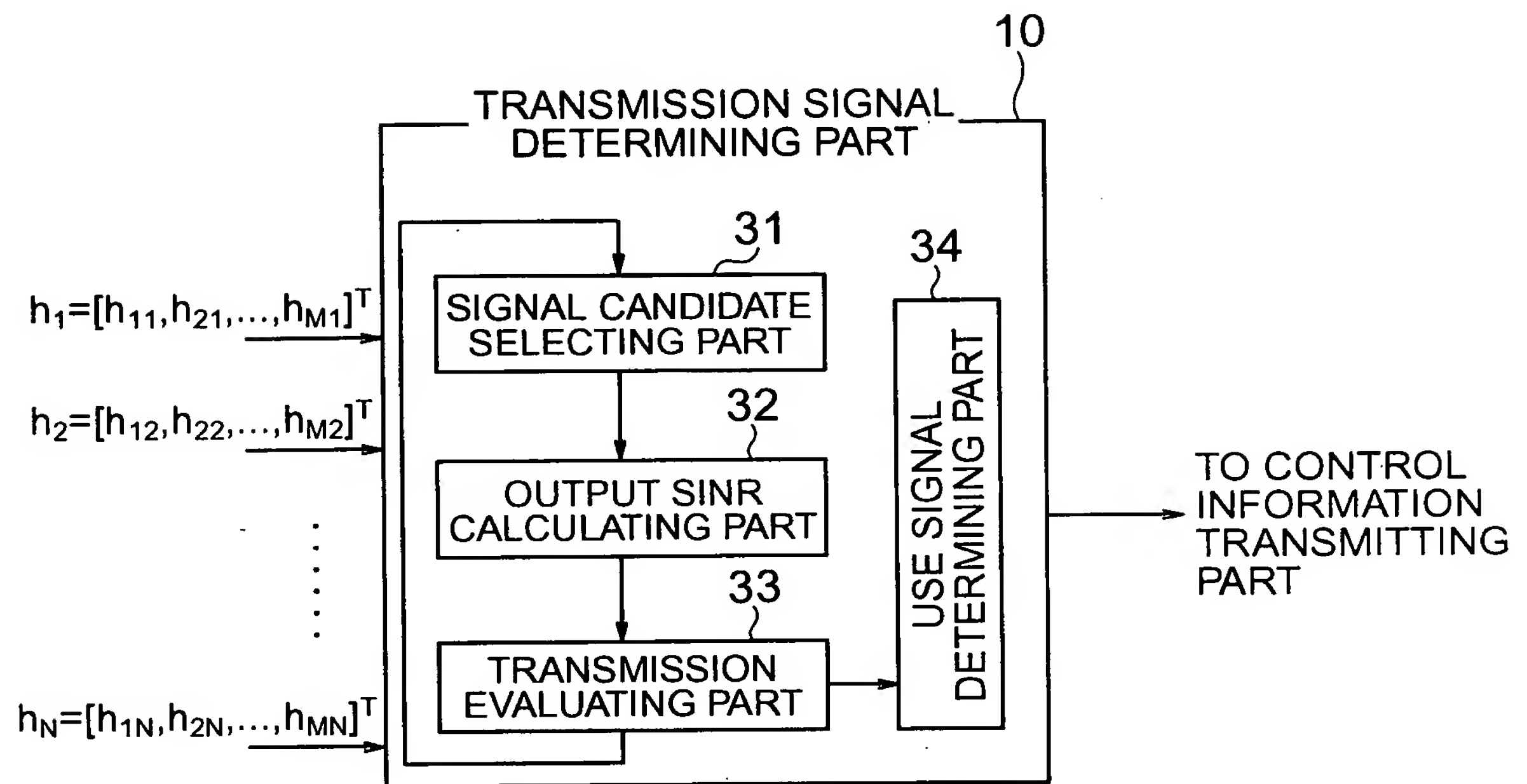


FIG. 23

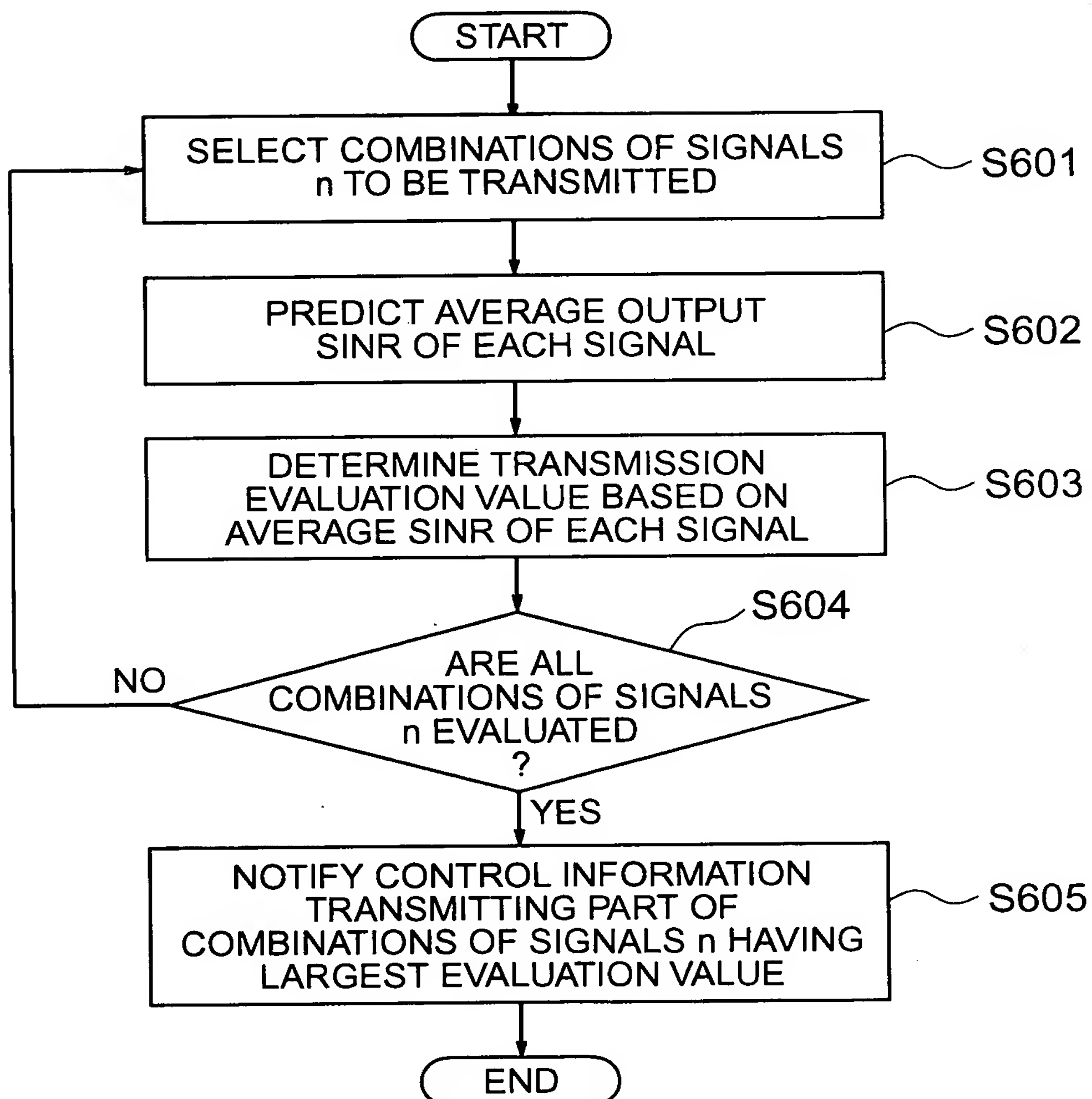


FIG. 24

AVERAGE SINR $\Gamma_n = E_1[\Gamma_{n,1}]$

$\Gamma_{n,1}$: SINR (SUB-CARRIER UNIT)

※n: TRANSMISSION ANTENNA, 1: SUB-CARRIER NUMBER

FIG. 25

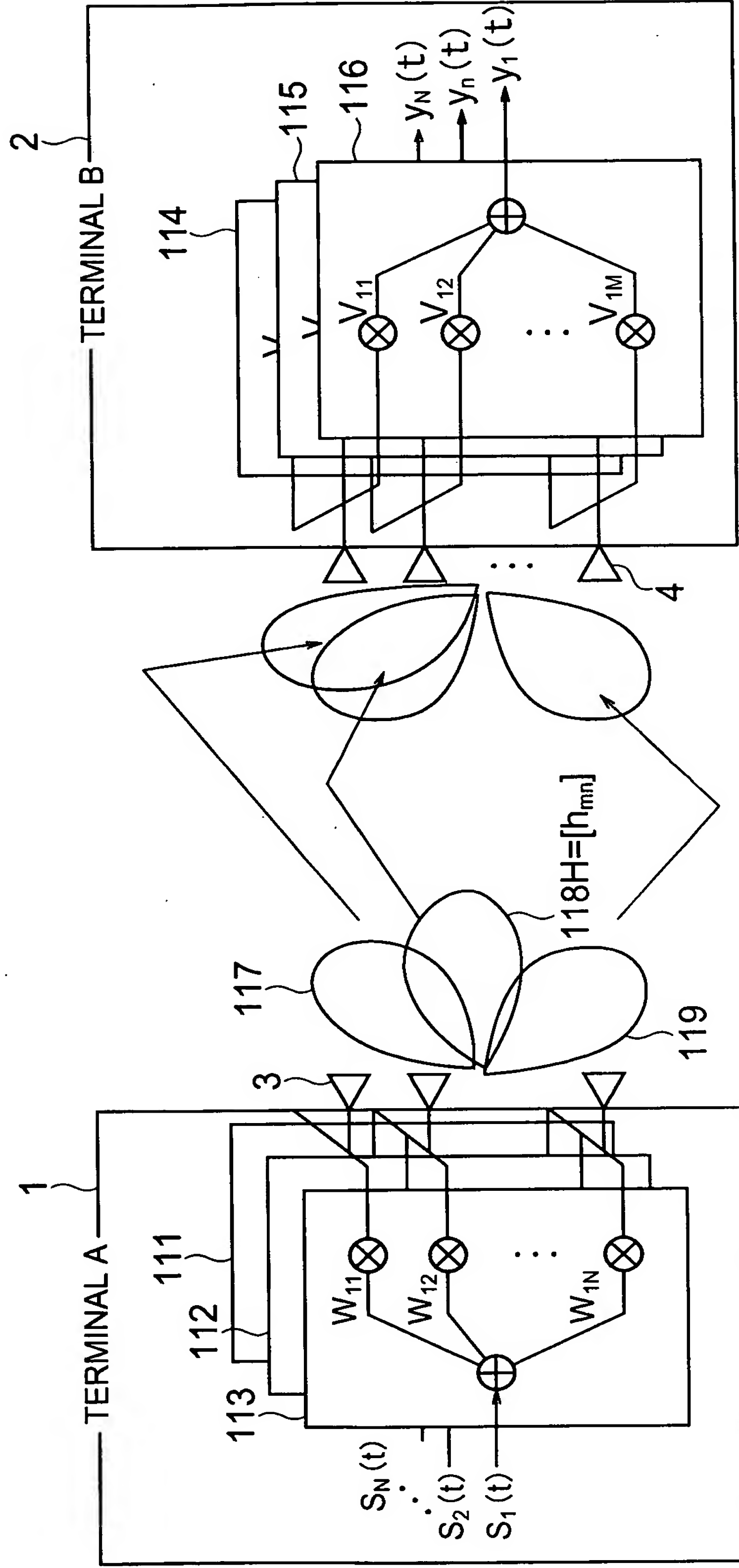


FIG. 26

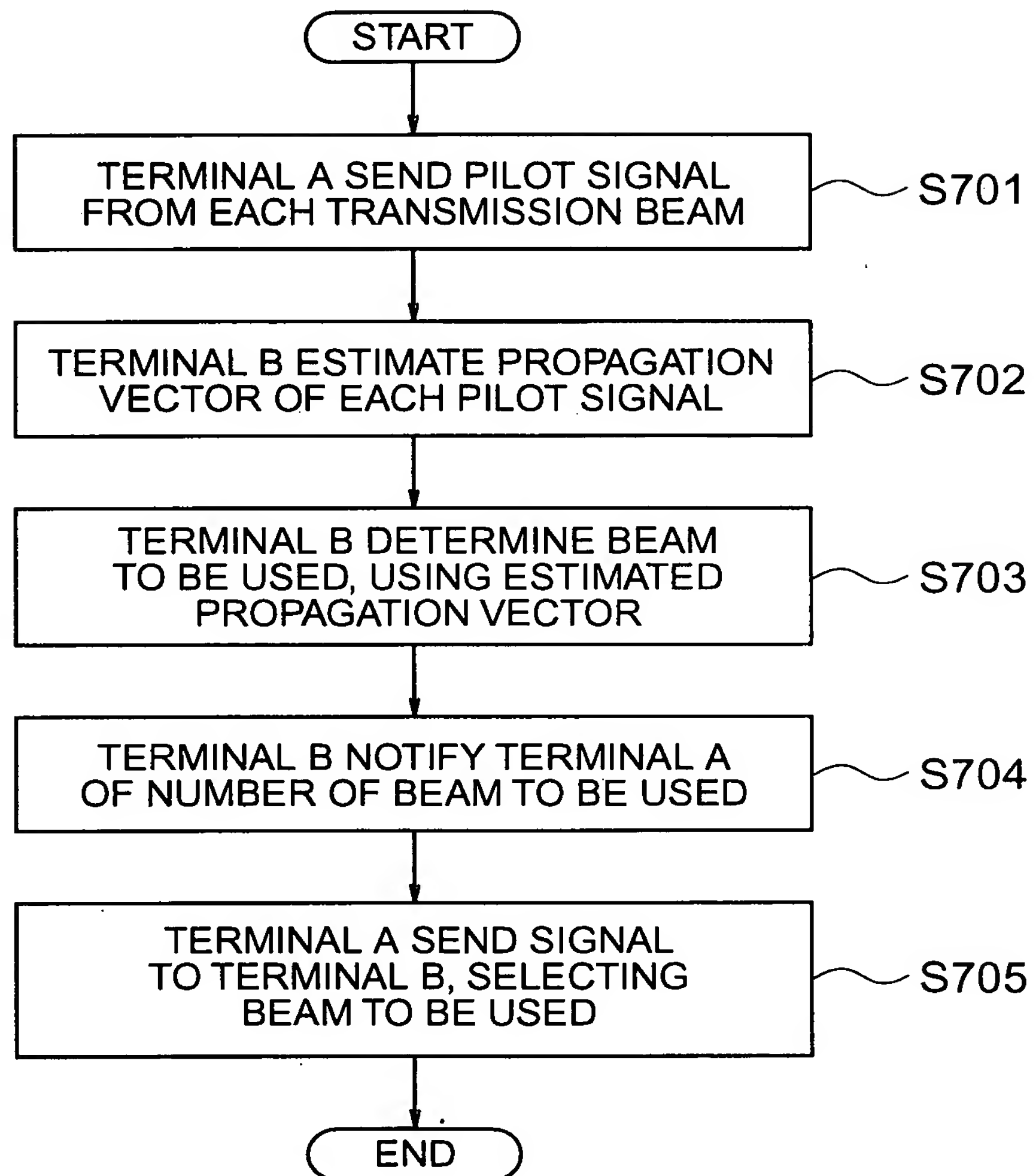


FIG. 27

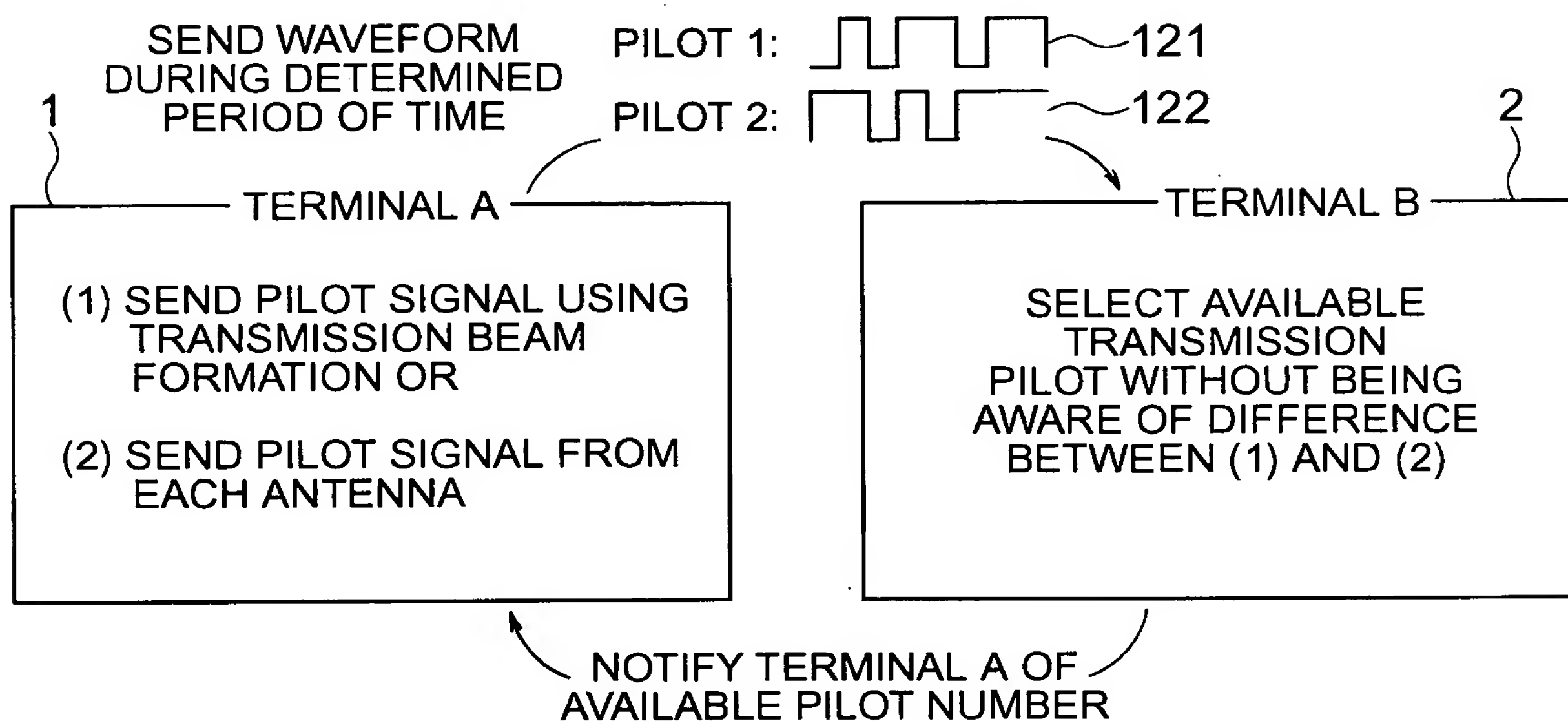


FIG. 28

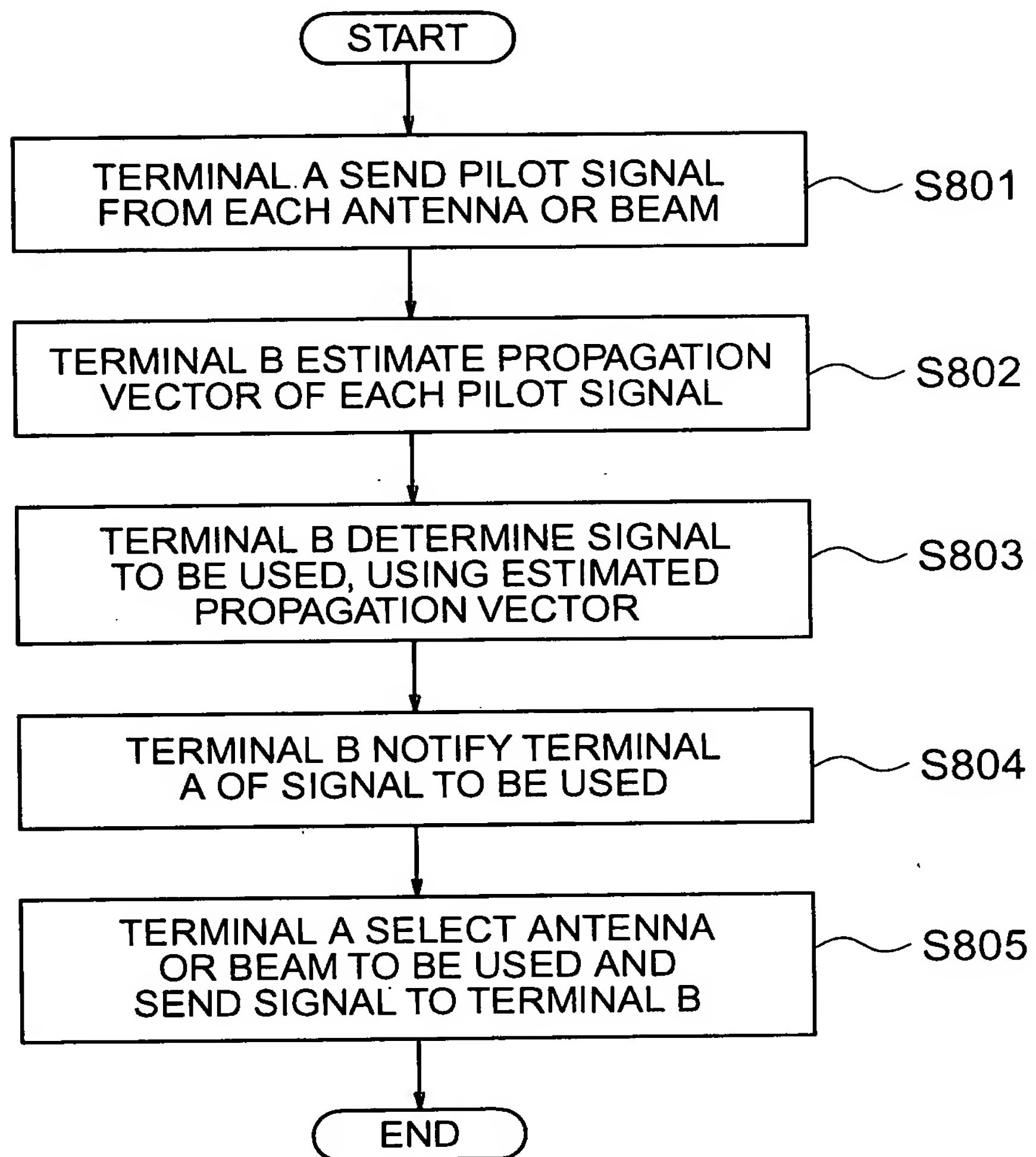


FIG. 29

75 MAGNITUDE OF POWER OF EACH SIGNAL (#1,#2,#3)	72 OUTPUT SINR [dB] ($\Gamma_1, \Gamma_2, \Gamma_3$)	73 TRANSMISSION EVALUATION VALUE OF EACH SIGNAL (TRANSMISSION SPEED)(#1,#2,#3)	74 TOTAL OF TRANSMISSION EVALUATION VALUES
(3,0,0)	(14.0, - , -)	(9.5,0.0,0.0)	9.5
(0,3,0)	(- ,15.3, -)	(0.0,11.2,0.0)	11.2
(0,0,3)	(- , - ,2.2)	(0.0,0.0,8.8)	8.8
(2,1,0)	(9.1,6.8, -)	(5.4,4.5,0.0)	9.9
(0,2,1)	(- ,7.3,2.9)	(0.0,6.2,1.3)	7.5
⋮	⋮	⋮	⋮
(1,1,1)	(-0.5,3.4,0.3)	(0.6,1.5,1.8)	2.9

※ IN CASE OF THREE TRANSMISSION ANTENNAS

SELECT LARGEST
TRANSMISSION SPEED

FIG. 30

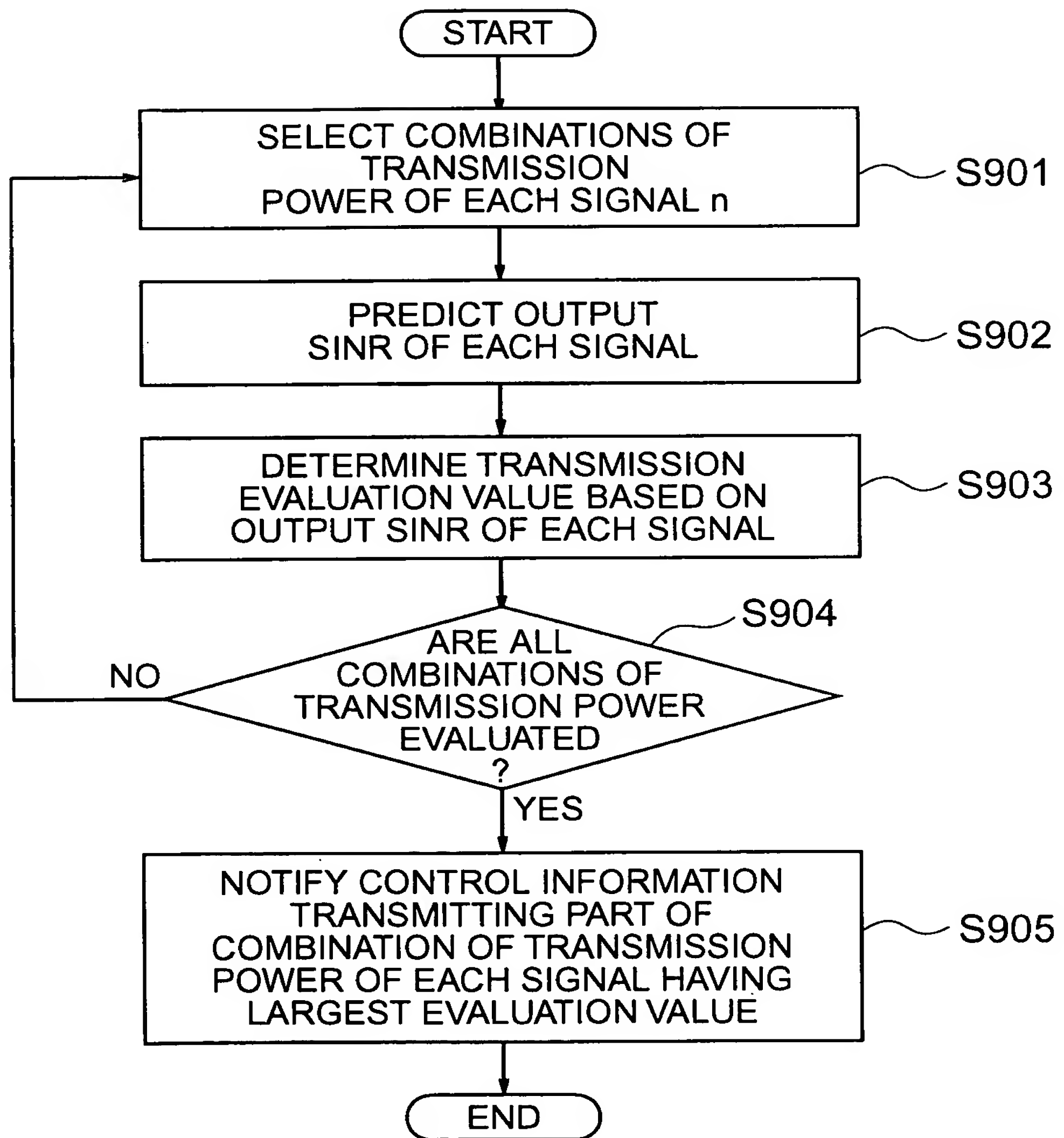


FIG. 31

TERMINAL B ----> TERMINAL A (CONTROL SIGNAL)

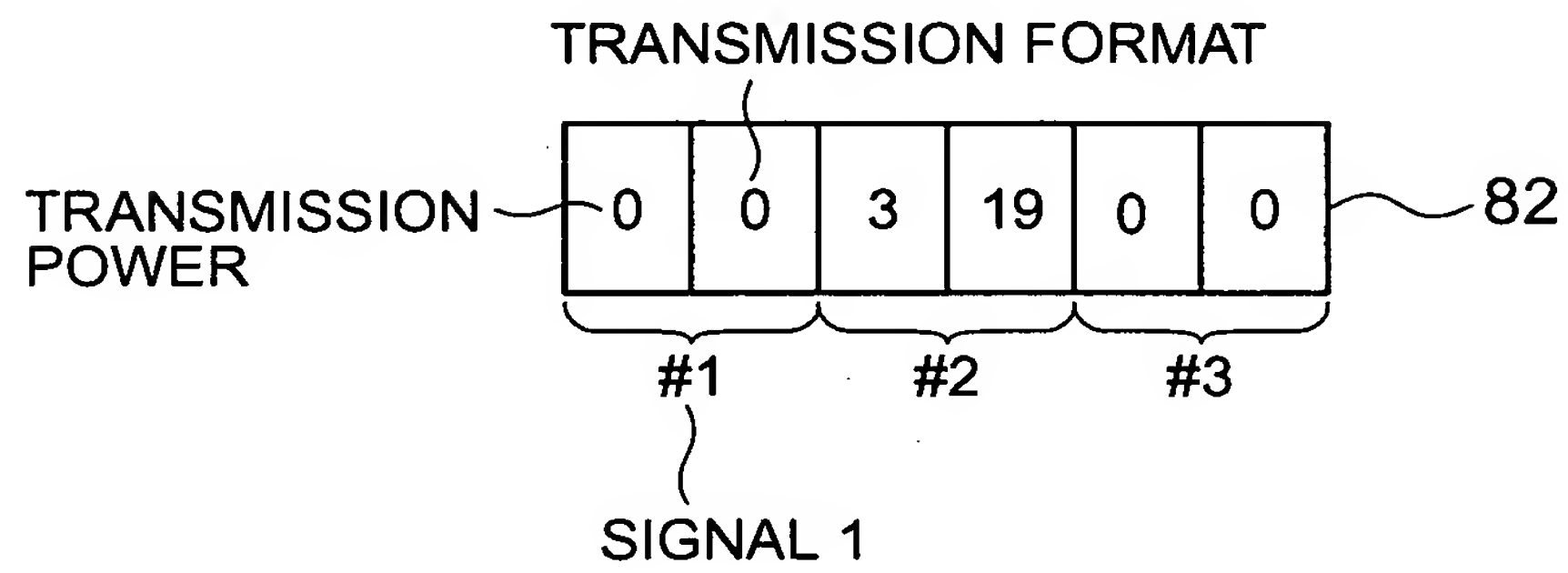


FIG. 32

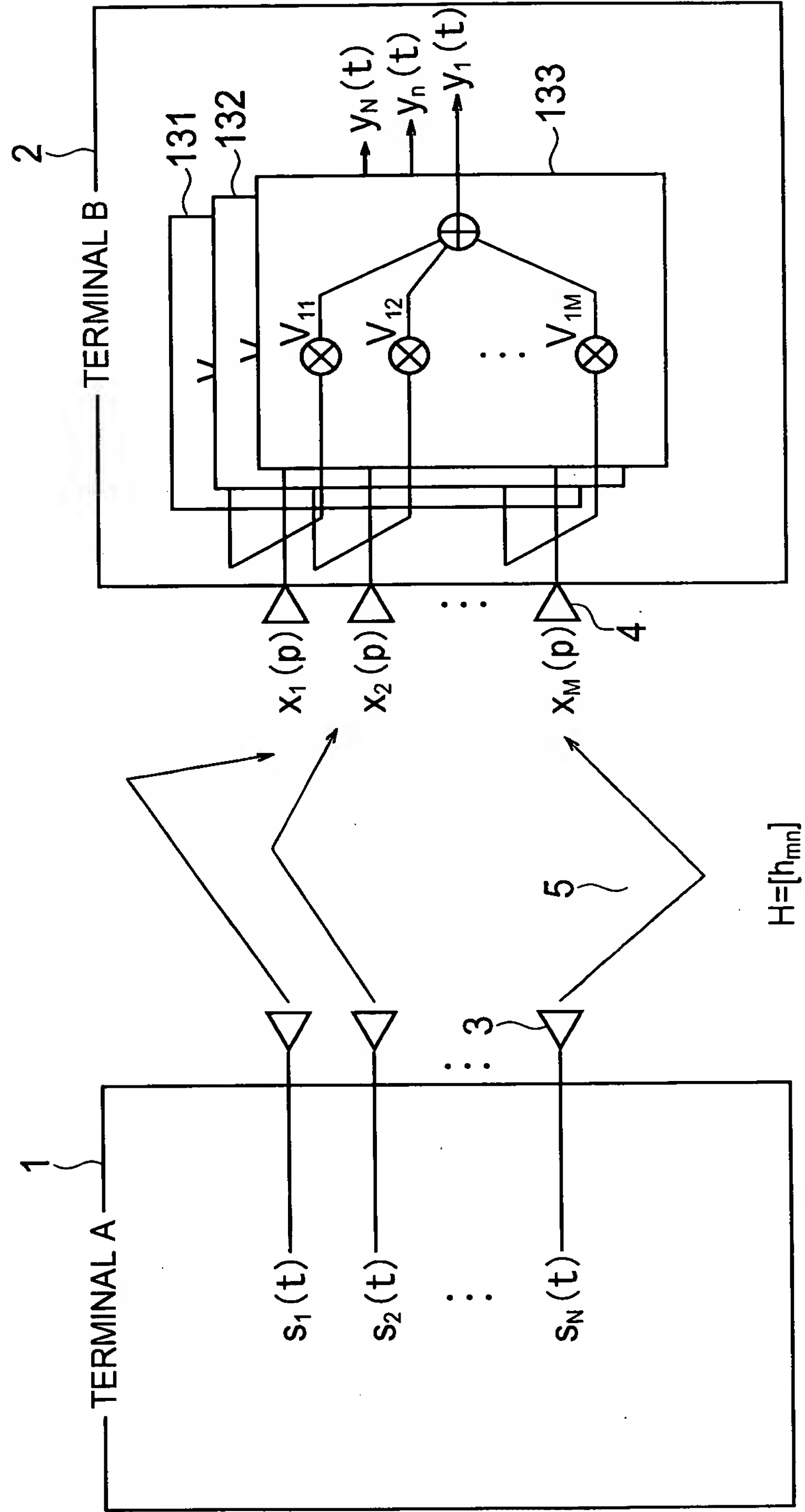


FIG. 33

